Fulfilling the Maker Promise: Year Two

June 8, 2018

A COLLABORATION BETWEEN

Maker Ed

AND

Digital Promise

Accelerating Innovation in Education

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Maker Promise: The First Two Years

Maker learning is hands-on and creative, promotes student agency, and provides authentic and meaningful learning experiences. Teachers, administrators, and parents continue to be drawn to the potential of learning through making as they have seen it has the power to facilitate student voice and choice; increase interest and skills in STEM; promote empathy and perspective taking abilities; and catalyze interdisciplinary experiences and make curriculum more relevant.

On March 9, 2016, two nonprofit organizations – Digital Promise, committed to accelerating innovation in education, and the Maker Education Initiative (Maker Ed), dedicated to empowering educators to facilitate meaningful learning experiences with youth – issued a call to action for U.S. school and district leaders to sign the Maker Promise, a concrete commitment by schools to dedicate a space for making, designate a champion for making, and display what students make. Since that time, this commitment has evolved into a broader campaign and network of support for educators, advocates, and leaders championing the growth of making for youth across the country.

To date there are 1849 Maker Promise schools, each represented by a school or district leader who has signed the Maker Promise. In total, there are more than 1908 Maker Champions, including these school and district leaders, as well as in-school and out-of-school educators and community advocates, who have signed the Promise and are committed to this work.

Over the last two years, Digital Promise, Maker Ed, and additional supporting organizations have shared resources and opportunities with these Maker Champions via the Maker Promise website (www.makerpromise.org) and a bi-weekly newsletter. We also feature stories and case studies to inspire Maker Champions with creative and replicable examples.

In-person connections, particularly among local peers, are important catalysts to growing maker education. To that end we have hosted and sponsored maker educator meetups across the country. In addition to hosting our own maker educator meetups at a few major education conferences, we offer a playbook and stipend for organizers who want to host their own local meetups.

Through a partnership with the Edcamp Foundation, we are providing materials to bring a maker learning activity to teacher-organized "un-conferences" to build comfort and connection with making and with local maker educator peers. Since February 2018, we have provided a Circuit Arcade material kit and activity guide to more than 150 Edcamps across the United States. We launched this partnership by hosting the first Edcamp: Maker Promise and will support Edcamp organizers who are planning similar maker-themed edcamps with a stipend and additional resources.

In May 2017, Maker Ed hosted the 3rd Annual Maker Educator Convening with more than 250 educators in attendance, representing 25 states. A plurality (41 percent) of the convening attendees were K-12 educators, with educators from various organizations, museums, libraries, and universities also in attendance. Prior to the main event, Maker Ed hosted a smaller summit with 70 leaders in the field of maker education, including educators, to engage in a collaborative design process focused on reaching those who have not been served by maker education. Maker Ed will host the 4th Annual Maker Educator Convening on October 19-20, 2018, at The Tech Museum in San Jose, CA. We invite and encourage Maker Promise signees to attend.

Creating sustainable maker education programs by supporting leaders has always been the core focus of the Maker Promise program. We also understand that leadership in K-12 maker learning must come from those in both official leadership positions (such as school administrators) and unofficial ones (such as teachers, librarians, and staff). We have seen that making in schools often begins at the grassroots level, with educators organizing clubs or in-class

maker activities using available resources and time. However, we have also seen that if efforts remain only with educators and are not supported by the school administration, they often stall or end due to burn-out or employee transition.

To grow these activities into sustainable programs across entire schools and districts, administrators must: get involved and ensure structures are in place to cultivate an institution-wide maker culture that allows maker activities to thrive; create opportunities for professional learning for educators new to making; and celebrate making with all school stakeholders to grow buy-in from the community.

A key challenge identified in our previous report, Fulfilling the Maker Promise: Year 1, was the lack of frameworks for planning and designing school-wide maker programs. In response to this challenge to support sustainable leadership in K-12 maker learning, Digital Promise published the Maker Learning Leadership Framework in December 2017. Organized around three goals – establish the vision, build the culture, and make the program – the framework provides cross-organizational leadership teams of administrators, educators, and support staff with a set of tools to use to collaborate while building their maker learning programs. It was researched and developed over the course of a year with input from organization partners (including Maker Ed), leading education researchers, and, most importantly, maker educators and administrators from several of the most established school maker learning programs in the country. Tools were piloted with a cohort of six school districts from Digital Promise's League of Innovative Schools who were actively pursuing the establishment or growth of their own maker learning programs. We will continue to add to, refine, and update the Framework, and are interested in hearing from schools and districts as they work with it.

To further grow our understanding of how maker learning is developing in both schools and informal learning environments, Digital Promise and Maker Ed conducted our second annual Maker Champion survey in November and December 2017. Two hundred and twenty four participants completed this survey. Survey questions were predominantly quantitative, with a few open-ended qualitative questions. Qualitative responses were coded to generate emerging and common themes.

The next sections of this report share what we have learned from this survey and an analysis of what the results suggest about the trajectory, challenges, and opportunities for maker learning. We conclude by sharing some of our plans for the next phases of the Maker Promise program and partnership.

Who are the Maker Champions?

One of the goals of the survey was to better understand who the Maker Champions are. This year, we added new questions to learn about the background and demographics of participants in addition to understanding their role in bringing maker learning opportunities to students.

We found that a majority of participants identified themselves as white (81 percent) and female (72 percent) (see Figures 1 and 2). These results are consistent with the current state of racial diversity among educators in the US, as well as with what was found in previous research among maker educator communities.

With what gender do you identify?
n=201

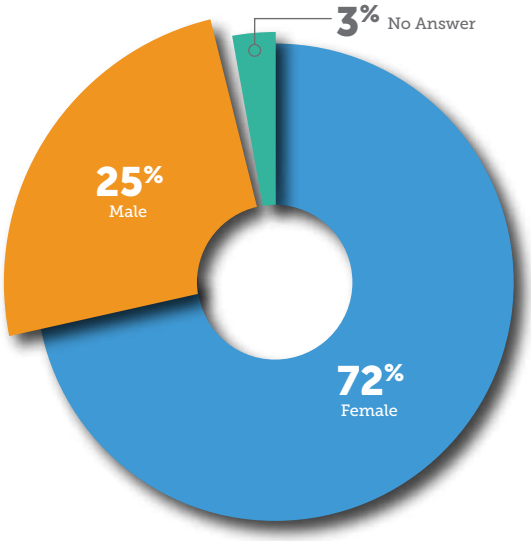

Figure 1: Participants' Reported Gender

With what ethnicity do you most identify?
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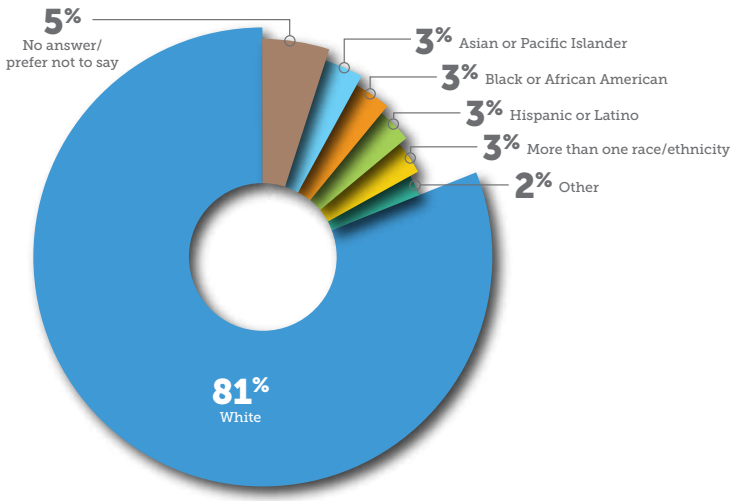


Figure 2: Participants' Reported Ethnicity

I am a...
n=202

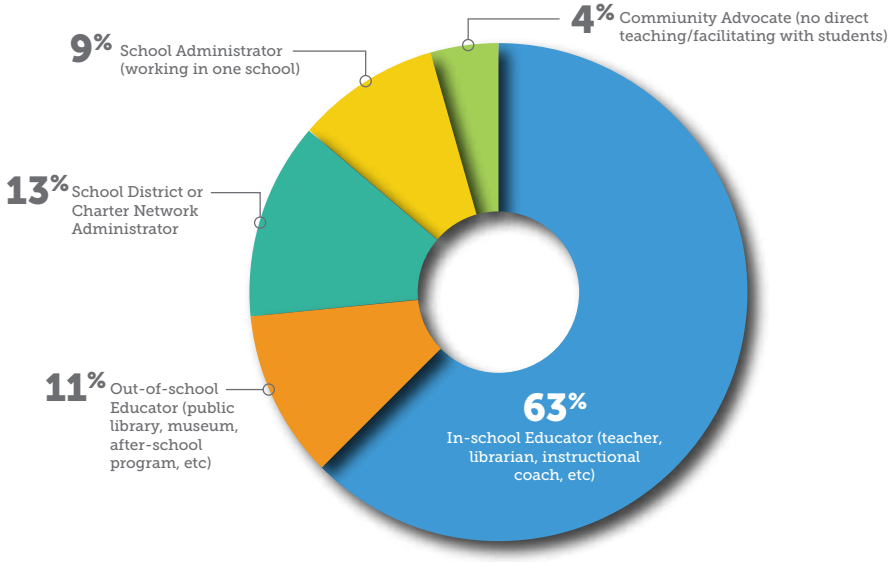


Figure 3: Participants' Educational Roles

Respondents were asked to categorize their professional roles within five groups. Responses were similar to the overall makeup of Maker Promise signers who identify with the same categories when signing the Promise:

- In-School Educator (teacher, librarian, instructional coach, etc.)
- Out-of-School Educator (public library, museum, after-school program, etc.)
- School Administrator (working in one school)
- School District or Charter Network Administrator (working with multiple schools)
- Community Advocate (no direct teaching/facilitating with students)

In-school educators (63 percent) represent most Maker Champions (see Figure 3), which illustrates that making continues to be initiated and developed at a grassroots level (2017 report). Administrators made up a little more than a fifth of the responses (22 percent) in this year's survey (see Figure 3).

In response to additional questions regarding what types of schools Maker Champions work with, we found that:

- Most Maker Champions work with a single school rather than their entire district.
- Participants identified working with students more in elementary and middle school (62 percent) than high school (26 percent).
- 81 percent of Maker Champions work in public schools, while approximately 87 percent of teachers nationally work in public schools. This 6 percent difference may suggest slightly higher adoption of making in private and parochial schools.

Where and how is making happening in schools?

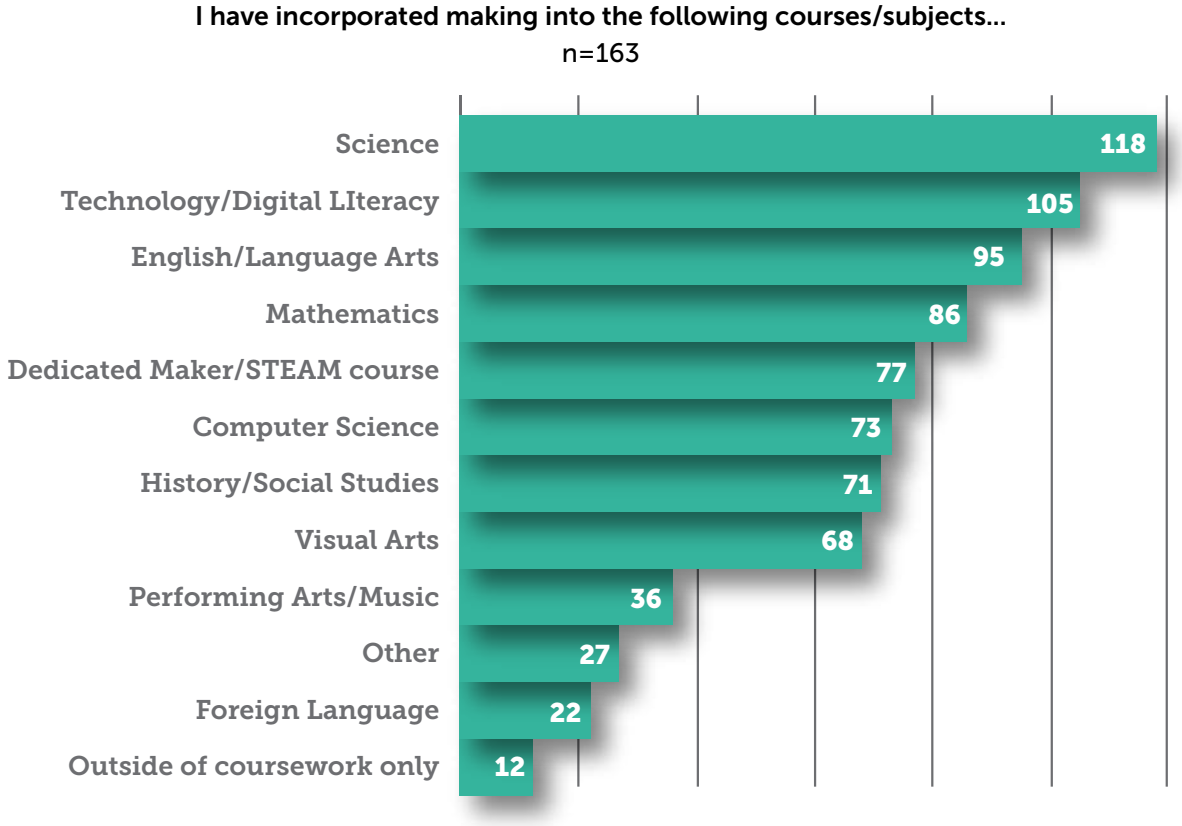


Figure 4: Reported Integration of Making by Academic Subject

Maker Champions are facilitating making in many ways and engaging students in a variety of formats and settings. While in last year's report survey respondents noted a concern about the lack of models for academic integration, many educators surveyed this year are finding ways to integrate making into various core subject areas, with science courses experiencing the most maker learning integration (see Figure 4). Schools also continue to pursue making in technology classes or stand-alone maker learning courses (see Figure 4).

It was interesting to find that many Champions who responded to this survey identified English/Language Arts as an area in which they have incorporated making. Maker learning is very often discussed as being linked to STEM subjects or the arts, but many have made the case for connecting making to the humanities. It is encouraging to see this area represented so strongly in responses with English/Language Arts as the third highest ranking subject for integrating maker learning activities (see Figure 4).

In an open-ended question, participants were asked to describe how maker learning is implemented in

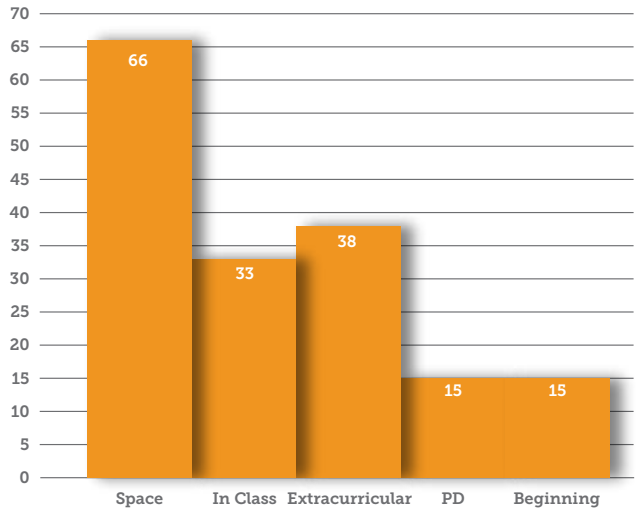


Figure 5: Maker Learning Implementation Areas in 2016

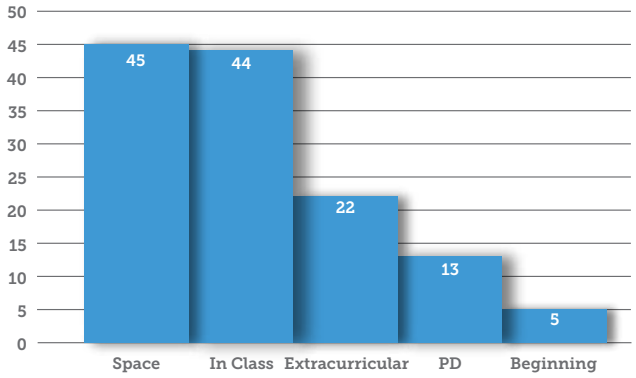


Figure 6: Maker Learning Implementation Areas in 2017

their school or district. Mirroring results from last year's report, the same five maker learning program implementation areas emerged as common themes:

- Space: School has a dedicated space where students can engage in maker learning.
- In Class: School engages students in maker learning in the classroom.
- Extracurricular: School has extracurricular maker learning activities for students.
- Professional Development (PD): School has a professional development opportunity for educators to learn about making.
- Beginning: School/District is currently working towards implementing maker learning but has few or no programs or activities in place.

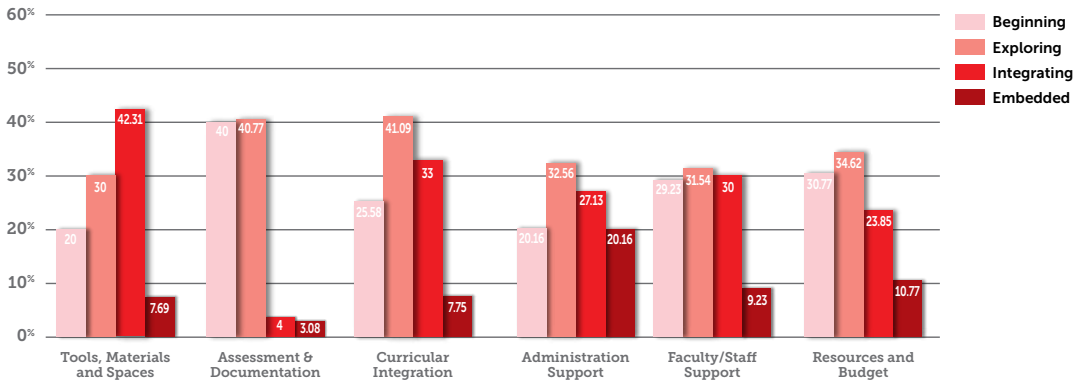
An interesting development since the previous year is the emerging balance of making happening in dedicated makerspaces and in classrooms (see Figures 5 and 6). This suggests that educators are more comfortable integrating making in ways that use resources available to them in their classrooms. If integration of making into the everyday culture and curriculum of a school is key to the sustainability of the movement (which we believe it is), we see this as an encouraging progression.

Another theme identified while coding this open-ended question was that some Champions feel maker learning and integration is siloed; activities are not understood across a district but only within respondents' individual schools or classrooms. When discussing their programs, many educators made a particular point to state that their response was only about their school, or specified that making was happening elsewhere at their district but they did not have the understanding to talk about the wider activities. While it makes sense that Champions would know their own activities best, cross-pollination is an important part of building a school- or district-wide maker culture, and cross-organizational maker leadership teams should work to deliberately cultivate a sharing culture. We will examine how the Maker Promise can provide more resources to support intra-school and intra-district collaborations in the future.

How are maker learning programs developing?

2016

n=130



2017

n=85

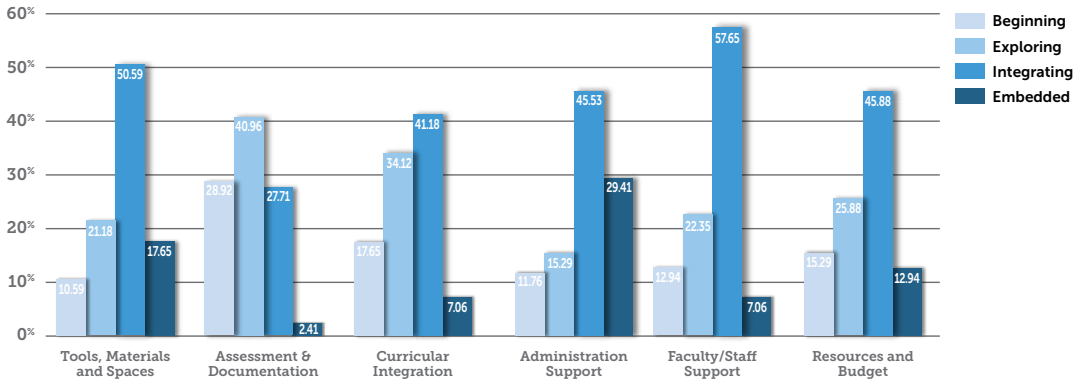


Figure 7: Reported Level of Implementation Among Key Maker Learning Program Factors in 2016

Figure 8: Reported Level of Implementation Among Key Maker Learning Program Factors in 2017

Based on interviews conducted with educational leaders before the 2016 Maker Champion survey, we identified six areas as the most significant for successfully integrating maker learning programs in schools. These six categories included: Faculty and Staff Support; Administration Support; Resources and Budget; Tools, Materials, and Spaces; Assessment and Documentation; and Curricular Integration (see Appendix B). A rubric with these six areas was provided to respondents to reference in responding to this question in both the 2016 and 2017 survey so results could be compared. In each category, survey respondents could rate their district as "Beginning," "Exploring," "Integrating," or "Embedded." At the fourth level, or "embedded," making is no longer seen as something separate or different, but is a regular part of the day-to-day learning for all students in the schools.

In general, the longitudinal trend shows that Maker Champions are rating more aspects of their programs at higher levels of integration (see Figures 7 and 8). In particular, we see there is significant growth from Exploring to Integrating for Administration Support, Faculty/Staff support, and Tools, Materials, and Spaces in comparison to last year's results. Similarly, there is progress with Curricular Integration as well.

This finding suggests that current Maker Promise signers are progressing in their program development and likely means that more recent signers may

already be further along in developing their programs. While the findings from this self-evaluation echo the previously described findings - specifically that participation in maker learning by both educators and administrators is growing and that these trends lead to increased integration of making into school curriculum - it also raises a concern that fewer new programs and educators are getting started. We plan to investigate this question further, and to continue to expand wide outreach to ensure that maker learning continues to grow outside of existing maker educator networks and their immediate circles.

In both years, the trailing indicator is Assessment and Documentation, described in the rubric as particularly pertaining to the assessment of student learning and progress. Although this indicator is furthest behind among the six, there is an upward trend for Assessment and Documentation over time, with fewer responses in the Beginning category and more in the Exploring and Integrating categories. While in the next section of this report we will see curriculum resources are still in highest demand, we expect as that demand is met and more programs reach higher levels of curriculum integration, the demand for robust assessment resources will begin to rise. In an open-ended question asking participants to elaborate on their responses to this self-evaluation, the growing need for assessment resources was called out explicitly in a few comments like the following example:

"I'm finding administrators so fearful of assessment results that they struggle with thoughts of supporting maker education."

An additional challenge highlighted in this optional open-response question is that some faculty, particularly at the high school level and in high-achieving schools, would prefer making to be elective or extra-curricular, rather than integrated into the core curriculum. This was articulated in comments such as the following:

"While our STEAM program is fully supported, I find that most faculty at the high school level are happy to have it be a separate thing. It is frustrating to try to integrate making into the different content areas, not because it is difficult, but because teachers feel the pressure of teaching to the state tests and the SATs and ACTs."

"Ours is a pretty high-achieving school, so teachers feel the time crunch and aren't sure how to 'fit it in.' S-l-o-w-l-y convincing a few to integrate and replace some traditional work with maker projects so we can continue to teach kids how to think more deeply and in new ways, not just facts/isolated skills."

What resources do Maker Champions need most?

Maker Champions were asked to rank the following resources in order of which would be most immediately valuable to supporting maker learning at their school/district:

- Professional Development - in person
- Professional Development - online
- Student project ideas and guides
- Student project documentation resources and guides
- Assessment resources and guides
- Cross curricular integration resources and guides
- Resources for advocating for maker learning

Generally, the responses were similar to 2016 results (see Figures 9 and 10). The most identifiable development is a decrease in demand for professional development. This would seem to suggest that more Maker Champions have increased access to the learning experiences they need than in the past. Schools and other providers of these opportunities should not infer from this that they are no longer needed, only that the need for additional types of resources is growing. We encourage providers of professional learning services and opportunities to continue to grow and expand their offerings.

Please rank in order of need which of the following resources would be most immediately valuable to supporting maker learning in your school or district.

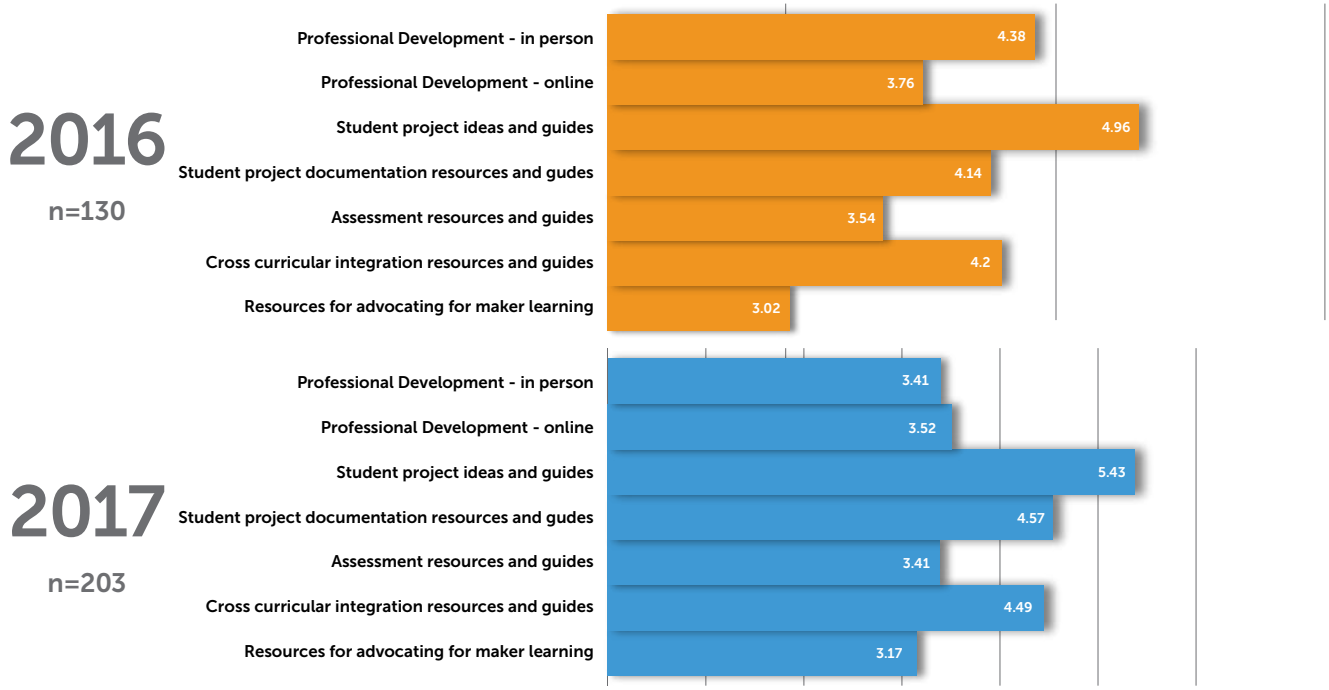


Figure 9: Resource Needs Reported in 2016

Figure 10: Resource Needs Reported in 2017

The biggest identified need continues to be Project Ideas and Guides, with the related need for student project documentation resources and guides trailing close behind (see Figure 10). Ideas for projects and lessons have been identified as important to maker educators in previous research around maker educator communities. While the responses expressed in figures 4, 7, and 8 suggest that curriculum integration is improving, Maker Champions still see room to grow and seek the resources to do so.

Year 3: Enabling and Supporting Continued Growth

As we enter the third year of Maker Promise, Digital Promise and Maker Ed are committed to continuing to support Maker Champions in growing the maker movement in education and sustaining the positive trends we have seen. We will continue to provide opportunities for connection and professional development through our meetup program and partnership with Edcamp, and we will explore new ways to connect the community online.

In response to the clearly expressed need for more resources for student projects and curriculum integration, we will aim to tailor resources shared in our newsletters to feature more of this type. A recent update to our MakerPromise.org website has already increased the ease of use and searchability of resources shared from our lead organizations and supporting partners.

We are also pleased to share that Maker Ed will add newly developed resources and project guides to its online **Resource Library**, directly addressing the common question on where to find easily integratable and purposeful activities and ideas. In addition, pathways to locate such resources within the Resource Library will be improved.

Digital Promise will continue to engage partner organizations and schools to update and revise the Maker Learning Leadership Framework. Our continued work with six pilot districts will inform this work, as will a partnership we are launching with ten schools from southwest Pennsylvania who will work with us and utilize the Framework to launch or expand their maker learning programs. In addition to the tools and case studies generated through these partnerships, additional resources will be added to support integrating practices suggested by learning science research, advocating for maker learning, and assessing maker learning.

In order to ensure that existing maker programs mature and new ones continue to form, we seek to support Maker Champions' efforts to document the effectiveness of their programs and positive learning outcomes for all students. As we pointed out earlier in this report, we expect demand for assessment tools to rise in the coming years and are excited to help schools integrate some of the growing research in this area into their programs. In particular, the **partnership between MIT and Maker Ed to study embedded assessments** has the potential to create new models that allow assessments to feel more natural to both students and teachers as they are making.

The Maker Promise team, from Digital Promise and Maker Ed, are excited to continue to learn from and to support Maker Champions everywhere as we cultivate and grow the maker learning movement so that all students can have opportunities to discover themselves as makers and learners.

Acknowledgements

Thanks to all the Maker Champions for their commitment to bringing opportunities to make to the students they serve, and for their willingness to share their experiences with us.

Thanks to our supporting partner organizations whose willingness to share their work freely with educators everywhere allows this movement to continue.

The Maker Promise is supported by the Gordon and Betty Moore Foundation, the Grable Foundation, and Chevron.

Appendix A Maker Promise Champions Survey

Maker Champions Survey 10/2017

Maker Promise — A collaboration between Maker Ed and Digital Promise

Tell us about yourself

By completing this survey you will be helping Maker Ed and Digital Promise determine the most useful resources we can share to support your programs. We rely on your feedback to provide you the best resources possible.

We will also use this data to share what we know about how maker learning is being implemented. We will share that report in the spring. You can find last year's report here.

We appreciate all the work you do to bring making to your students and for taking the time to share with us.

Thanks,
The Maker Promise Team

* 1. May we contact you directly if we want to find out more about your work or your answers to this survey?

- ◯ Yes, please email me if you want to discuss further.
- ◯ No, I'd rather not be contacted.

2. Your email address.

3. Your name.

4. With what gender do you identify?

- ◯ Female
- ◯ Male
- ◯ Non-binary
- ◯ Prefer not to say

5. With what ethnicity do you most identify?

- ◯ White
- ◯ Black or African American
- ◯ Hispanic or Latino
- ◯ Asian or Pacific Islander
- ◯ American Indian or Alaska Native
- ◯ More than one race/ethnicity
- ◯ Other
- ◯ Prefer not to say

* 6. I am a...

- ◯ School District or Charter Network Administrator (working with multiple schools)
- ◯ School Administrator (working in one school)
- ◯ In-school Educator (teacher, librarian, instructional coach, etc)
- ◯ Out-of-school Educator (public library, museum, after-school program, etc)
- ◯ Community Advocate (no direct teaching/facilitating with students)

7. Your School, district, or organization name.

8. State where your school or organization is located (or country if outside the USA).

9. Your job title or role.

* 10. Please rank in order of need which of the following resources would be most immediately valuable to your work?

- Professional Development - in person
- Professional Development - online
- Student project ideas and guides
- Student project documentation resources and guides
- Assessment resources and guides
- Cross curricular integration resources and guides
- Resources for advocating for maker learning

11. Is there anything else you would like us to know to be sure we provide the best resources possible?

Maker Champions Survey 10/2017

Maker Promise — A collaboration between MakerEd and Digital Promise

Tell us about your work

* 12. I work with:

- ○ One school
- ○ More than one school (but not an entire school district)
- ○ Every school in my school district

13. What percent of your work is with your school, district, or organization's maker learning program?

14. With which grade levels do you work or support?

- ☐ Pre-K and earlier
- ☐ K-2
- ☐ 3-5
- ☐ 6-8
- ☐ 9-10
- ☐ 11-12
- ☐ Post 12th Grade

15. My school(s) is(are)...

- ○ Public
- ○ Charter
- ○ Parochial
- ○ Independent/Private

16. I facilitate making with students in a...

- [ ] Classroom
- [ ] Library
- [ ] Computer Lab
- [ ] Dedicated Makerspace
- [ ] Other (please specify)

17. I facilitate making with students during...

- [ ] Class time
- [ ] During the school day but outside of class time
- [ ] Outside of the school day

18. I have incorporated making into the following courses/subjects...

- [ ] English/Language Arts
- [ ] Mathematics
- [ ] Science
- [ ] History/Social Studies
- [ ] Foreign Language
- [ ] Visual Arts
- [ ] Performing Arts/Music
- [ ] Technology/Digital Literacy
- [ ] Computer Science
- [ ] Dedicated Maker/STEAM course
- [ ] Outside of coursework only
- [ ] Other (please specify)

* 19. I am the person most responsible for implementing maker learning for my entire school or district...

- ◯ Yes
- ◯ This responsibility is shared and I will be completing the next section of this survey on behalf of our school/district
- ◯ This responsibility is shared and SOMEONE ELSE will be completing the next section of this survey on behalf of our school/district
- ◯ No

Maker Champions Survey 10/2017

Maker Promise

A collaboration between Maker Ed and Digital Promise

Tell us about your program

20. Approximately how many TEACHERS in your district engage in maker learning?

21. Approximately how many STUDENTS in your district engage in maker learning?

22. How many SCHOOLS in your district engage in maker learning?

23. Which grade levels are involved in maker learning?

- [ ] Pre-K and younger
- [ ] K-2
- [ ] 3-5
- [ ] 6-8
- [ ] 9-10
- [ ] 11-12
- [ ] Post 12th grade

24. Briefly describe how maker learning is implemented in your school or district.

* 25. Please use this linked rubric to self-evaluate integration of maker learning in your school(s). The rubric is based on an aggregation of the journey many schools have have followed when implementing maker learning, please link your answers to the rubric descriptions as accurately as possible for your specific implementation.

	Beginning	Exploring	Integrating	Embedded
Tools, Materials and Spaces	◯	◯	◯	◯
Assessment & Documentation	◯	◯	◯	◯
Curricular Integration	◯	◯	◯	◯
Administration Support	◯	◯	◯	◯
Faculty/Staff Support	◯	◯	◯	◯
Resources and Budget	◯	◯	◯	◯

26. Please provide any information that may help to inform us about your selections from the previous question.

* 27. I give permission for Digital Promise to share my response to this survey with its Maker Promise partner Maker Ed.

◯ Yes

Appendix B Maker Learning Self-assessment Rubric

	Beginning	Exploring	Integrating	Embedded
Faculty and Staff	There is one (or a small group of) teacher-champion interested in making. The champion is aware of he national conversation around making and maker education and is beginning to find ways to do maker work with students.	The teacher-champion offers a making or STEAM class or club for interested students - often by volunteering free-time or taking on an extra duty.	More teachers become excited about how they can integrate making into their own teaching practice and subject areas. The teacher-champion becomes a facilitator for these activities.	Making is ingrained in the culture of the school. Teachers use making in all aspects of their curriculum as a way to open up new possibilities for student agency and to facilitate authentic collaborations between disciplines.
Administration	There is no admin support, but the administration is not blocking.	The administration is curious and pleased with the stories being generated in the class and levels of student engagement.	Administration supports interested teachers integrating maker learning by providing collaborative planning opportunities, material resources, and professional development. Teaching or coordinting maker learning activities and materials becomes and official part of the teacher-champion's role.	Administration becomes champions of maker learning, dedicating significant resources to it and designing school structures and systems to accommodate open-ended projects, assessments, and collaborations. Teachers are expected to integrate maker learning into their programs and the teacher-champion is tasked entirely with supporting this work.
Tools and Space	The teacher-champion may seek funding for or receive a new tool like a 3D printer but does not know fully how it will be used, or the teacher-champion may not have a clear sense of what tools are needed and is seeking to evaluate some options.	There is a space or some access to tools such as a cart. Frequently there is a focus on 3-D printers or other high-tech tools. The tools are typically in a space used only by one teacher or class.	School has a space or mobile solution that can be used by more teachers. This space features a combination of low and high tech tools and materials. The teacher-champion likely still oversees the space, but it is used by other teachers as well.	The space becomes a central and shared resource for the school. There may still be an owner of the space, but he or she becomes a facilitator for others' usage, not the sole provider of services.
Curricular Integration	None.	There is a separate class or club for maker learning activities - often focused on one tool or skill like robots or 3D printing.	The champion has started outreach to other teachers, who jointly develop projects supporting their subject areas. Several classes across the curriculum are engaging in at least one student-centered hands on project each school year.	Projects are deeply integrated into every aspect of the school. Classwork consists of projects that are co-created and coowned by teachers and students across disciplines.
Assessments	None.	Making is typically situated in a class or club that has limited or no assessment requirements. What assessments there are are unstructured and informal.	Teachers struggle to find ways to assess the making they are integrating into their curriculum - workaround systems are created or maker projects go unassessed within formally assessed classes.	Schoolwide practice and systems change to create assessment structures that accommodate maker learning by allowing for more formative assessment, student reflection, and collaborative evaluation of learning between teacher and student.
Funding/ Budgets	Making activities use already available or donated materials.	School contributes a small amount of the technology budget to acquire some tools and/or teacher crowdfunds for supplies.	School or district dedicates a meaningful level of funding to provide necessary tools and consumables for projects as well as to support faculty time spent planning and integrating maker learning into practice.	School or district dedicates a significant level of funding to ensure that tools, materials, and supports are in place to allow all teachers to incorporate maker learning into their practice.